Les Rencontres de Physique des Particules 2022

Contribution ID: **23** Type: **not specified**

Inhomogeneity of rotating gluon plasma and Tolman-Ehrenfest law in imaginary time

Tuesday, December 6, 2022 11:00 AM (45 minutes)

We present the results of first-principle numerical simulations of Euclidean SU(3) Yang-Mills plasma rotating with a high imaginary angular frequency. The rigid Euclidean rotation is introduced via "rotwisted" boundary conditions along imaginary time direction. The Polyakov loop in the co-rotating Euclidean reference frame shows the emergence of a spatially inhomogeneous confining-deconfining phase through a broad crossover transition. A continuation of our numerical results to Minkowski spacetime suggests that the gluon plasma, rotating at real angular frequencies, produces a new inhomogeneous phase possessing the confining phase near the rotation axis and the deconfinement phase in the outer regions. The inhomogeneous phase structure has a purely kinematic origin, rooted in the Tolman-Ehrenfest effect in a rotating medium. We also derive the Euclidean version of the Tolman-Ehrenfest law in imaginary time formalism and discuss two definitions of temperature at imaginary Euclidean rotation.

Presenter: CHERNODUB, Maxim (CNRS, Université de Tours, France)